

WATER-RESISTANT AND FLOATABLE FOOTWEAR AND METHOD OF
MANUFACTURE THEREFOR

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CROSS-REFERENCE TO RELATED APPLICATION(S)

 This patent application is a divisional application of
U.S. patent application No. 10/264,015, filed October 3, 2002,
which is a continuation of U.S. patent application No.
10 09/690,552, filed October 17, 2000, now U.S. Patent No.
6,508,016, issued on January 21, 2003.

FIELD OF THE INVENTION

 This invention relates to footwear, in particular,
15 lightweight and comfortable footwear providing buoyancy in
water and resistance to water absorption, and a method of
manufacture therefor.

BACKGROUND OF THE INVENTION

20 Casual and lightweight shoes, particularly, sandals are
known. Many of these shoes and sandals (hereinafter
collectively referred to as "footwear") are flexible due to the
materials used to construct the soles. However, because many
of these materials are porous, such footwear readily absorb
25 water and become heavy and cumbersome. The absorbed moisture
or liquid may seep out over time causing discomfort to the
wearer, or even causing the wearer to trip or fall. Moreover,
such absorption may stain the footwear or promote the growth
of unsightly or odor-causing fungus.

30 To avoid some of these problems, some footwear have
provided drainage holes or other drainage features which
unfortunately do not prevent the absorption of water, but
simply provide an outlet for the water absorbed. However,
seepage is not avoided, nor is the growth of unsightly or
35 odor-causing fungus caused by the trapped moisture.

As with recreational footwear, particularly those adapted for use in water recreation, it is desirable to have footwear that have buoyancy and float in water. It is not uncommon for a shoe or sandal to slip off one's foot while ingressing or egressing a boat. It is also not uncommon for a shoe or a sandal to fall into a swimming pool. Accordingly, footwear which stay afloat in water, while resistant to the absorption of water, provide many advantages.

Another desirable feature in footwear is comfort in the areas of direct contact with the feet. While many footwear are desirably casual and lightweight, the desire to minimize weight has left many footwear with uncomfortable inner soles that lack a liner that is both comfortable and slip-resistant.

Furthermore, current fashion trends mandate footwear to come in a wide variety of colors. It is therefore desirable therefore to provide footwear which address the foregoing problems, but also be suitable to arrive in a variety of colors. In order to meet the ever-changing tastes of the marketplace, the color of the footwear should be easily alterable.

SUMMARY OF THE INVENTION

The present invention is directed to a new and improved footwear comprising a sole including an outsole and insole, an upper member affixed to the sole, wherein said footwear is floatable in water. In particular, the insole of the footwear is constructed of the material "marine buoy;" that is, the insole has an inner structure and an outer coating, the inner structure being constructed of a thermoplastic resin and the outer coating being constructed of a vinyl polymer. As such, the footwear is advantageously water-proof and provides buoyancy in water. The upper members of the footwear may also be constructed of the marine buoy material and they

may be configured as a continuous strap or flaps that are detachably attached to each other. The outsole of the footwear may be configured in close conformity with the insole, or it may include a peripheral border extending upwardly and around said insole.

The present invention is also directed to a method for producing a footwear with an insole, an outsole and upper members, comprising the steps of: forming the outsole, forming the insole by forming an inner structure from a thermoplastic resin, immersing the inner structure in vinyl polymer, arranging the upper members relative to the insole and the outsole to form said footwear, securely affixing the insole, the outsole and the upper members to each other. A step of the method may include providing apertures in the insole adapted for securing the upper members before immersing the insole in the vinyl polymer.

The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of the preferred embodiments, taken in conjunction with the accompanying drawings, which illustrate, by way of example, the principles of the invention.

25 BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an embodiment of a footwear of the present invention;

FIG. 2 is a side elevational view of the footwear of FIG. 1;

30 FIG. 3 is top plan view of the footwear of FIG. 1;

FIG. 4 is a bottom plan view of the footwear of FIG. 1;

FIG. 5 is a cross-sectional view taken along line 5-5 in FIG. 1;

FIG. 6 is a cross-sectional view taken along line 6-6 in FIG. 1;

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FIG. 7 is a perspective view of an alternative embodiment of the footwear of the present invention;

FIG. 8 is a perspective view of another alternative embodiment of the footwear of the present invention;

FIG. 9 is a side elevational view of the footwear of FIG. 8;

FIG. 10 is a perspective view of yet another alternative embodiment of the footwear of the present invention;

FIG. 11 is a side elevational view of the footwear of FIG. 10; and

FIG. 12 is a perspective view of footwear of FIG. 10, with upper members detached from each other.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. 1 and 2, an embodiment of a footwear 10 of the present invention is shown. The footwear has a sole 12, including an insole 14 and an outsole 16, and upper member or members (hereinafter used interchangeably) 18 affixed to and extending above the sole 12 for securing the footwear 10 to the wearer's foot (not shown). The upper members 18 may include a strap 20 and a fastening member 22 both adapted and configured to conform to the wearer's foot. In particular, the strap 20 is configured to extend above the foot and the fastening member 22 is configured to extend between the toes of the foot. Referring to FIGS. 5 and 6, the ends 24 of the upper members of this embodiment of the footwear 10 are securely affixed to the outsole 16 by, e.g., adhesives or glue. As understood by one of ordinary skill in the art, the upper members may be connected to the sole 12 by a variety of different means, including the formation of a nub at the ends 24 of the upper members which are received in appropriately-sized apertures defined in the sole 12, or other fastening or connecting structures.

Referring to the embodiment illustrated in FIGS. 3 and 4, the insole 14 and the outsole 16 are made from flexible materials and are of substantially the same configuration such that their respective peripheral outer edges are substantially even with each other. The outsole 16 may be constructed of a suitably flexible, elastomeric and/or durable material for resisting wear while providing tread. Rubber, for example, may be used to construct the outsole 16. In this illustrated embodiment, the outsole 16 has a substantially uniform thickness of approximately 3/16 inch throughout the length and width of the footwear 10 (see FIG. 2). A walking surface 19 of the outsole 16 is configured with a pattern to provide tread and friction (see FIG. 4).

Referring to FIGS. 5 and 6, the insole 14 may be constructed of a combination of flexible materials commonly referred to as "marine buoy" to resist water absorption and provide buoyancy in the footwear. The insole 14 includes an inner structure 30 that may be foam-like and is at least partially, if not substantially wholly, encapsulated in a water-proof, water-repellant and/or water-resistant sealant coating 32. The inner structure 30 is compressible and of a relatively low density compared to the outsole 16, such that it cushions the foot. Suitable materials for construction of the inner structure 30 include a thermoplastic synthetic resin or a thermoplastic synthetic resin containing a plasticizer. Such a suitable thermoplastic resin composition may comprise of the following:

30	NBR (nature polybutadine rubber)	30%
	PVC (polyvinyl chloride paste resin)	30%
	Filler talc	12%
	Foaming agent	10%
	Plasticizer	12%
35	Process oil	6%

The resin may be molded, trimmed, cut or otherwise configured (before, during or after curing, as understood by one of ordinary skill in the art) as desired, but preferably to conform substantially to outer shape of the foot. The thickness of the inner structure 30; however, may be as is desirable and/or functional. In a preferred embodiment, the thickness is substantially uniform throughout the length and the width of the sole 12 at approximately 1 1/2 inches. It is understood that the thickness of the inner structure 30 may be nonuniform as desirable or appropriate to conform to the shape of the foot. The inner structure 30 has a top surface 34, a bottom surface 36 and a side surface 38 extending around the outer perimeter of the inner structure between the top and bottom surfaces.

The coating or surface 32 functions as a barrier or sealant of the inner structure 30 to the environment. As such, the coating 32 is flexible and has water-proofing, water-repelling and/or water-resistant properties. Suitable materials include vinyl polymer or vinyl co-polymer compositions (used interchangeably herein) which may be readily mixed with any of a variety of color pigments for coloring the coating 32 as desired.

As mentioned, color pigments may be added to, mixed in, and/or selected in the vinyl polymer. Accordingly, the footwear 10 may be readily manufactured in a variety of colors to suit the tastes of the marketplace without substantial changes in the manufacturing process or equipment. In that regard, the color of the insole may be selected to purposefully match or otherwise complement the color(s) of the upper members 18.

To apply the coating 32, the inner structure 30 once cured and shaped is immersed in the vinyl polymer. As such, the inner structure 30 is effectively encapsulated or sealed

within an effective water-resistant, if not water-proof barrier. Moreover, the coating 32 so encapsulating the inner structure 30 provides a comfortable and slip-resistant upper surface 33 with which the foot directly contacts when the footwear 10 is worn. Once constructed, the insole 14 and the outsole 16 are securely affixed to each other and preferably by means of adhesive or glue.

The upper members 18, in particular the strap 20, may also be constructed similarly to insole 14. In that regard, as shown in FIG. 6, the strap 20 may have an inner structure 40 made of the foregoing resin and a coating 42 of vinyl polymer, whereby both the inner structure 40 and the coating 42 extend along the length of the strap 20. For the average-sized foot, the strap 20 may have a length of approximately 9.0 inches and a diameter of approximately 0.5 inches. Accordingly, the strap 20 and the insole 14 provide a comfortable contact surface for the foot, while also being water-resistant, if not water-proof, like the insole 14.

As also shown in FIGS. 1 and 5, the fastening member 22 may be a strip of woven textile 23 that is configured to provide a loop through which the strap 20 extends. A plastic or latex tube 25 may be used to secure together ends 44 of the fastening member.

As mentioned, the ends 24 of the upper members 18 are securely affixed to the sole 12 by adhesive or glue. In the illustrated embodiment of FIGS. 1, 5 and 6, apertures 26 are configured in the insole 14 to permit the ends 24 to pass through the insole 14 and come into direct contact with the outsole 16. In that regard, the apertures 26 are configured in the inner structure 30 before it is immersed in the vinyl polymer, so that the apertures are, too, provided with the coating 32.

Accordingly, the footwear of FIG. 1 may be constructed

substantially by the following steps:

- Step 1: providing the outsole 16;
- 5 Step 2: forming the insole 14, including preparing the
 resin composition and configuring it into the
 inner structure 30;
- Step 3: immersing the inner structure 30 in the vinyl
 polymer to provide the coating 32;
- 10 Step 4: forming the strap 20 of the upper members 18,
 including preparing the resin composition and
 configuring it into the inner structure 40;
- Step 5: immersing the inner structure 40 in the vinyl
 polymer to provide the coating 42 ;
- 15 Step 6: providing the upper members 18, including
 arranging the strap 20, the fastening member 22
 and the tube 25 relative to each other; and
- Step 7: securely affixing to each other, the outsole
 16, the insole 14 and the upper members 18 by
20 adhesive or glue.

The method of the present invention may also involve the following steps:

- Step 2a: forming the apertures 26 in the inner structure
 30 before it is immersed in the vinyl polymer.
- 25 Moreover, Steps 4 and 5 may be bypassed if the upper
 members 18 are not to be constructed of the marine buoy
 material. It is therefore understood by one of ordinary skill
 in the art that the foregoing steps need not be taken in the
 sequence presented, nor does each step need to be taken in
30 manufacturing the footwear 10. The method may be altered as
 appropriate or desired depending on the desired configuration
 and/or embodiments of the footwear as described further below.

As illustrated in FIGS. 7-11, the upper members 18 may adopt an unlimited number of variations in their configuration
35 or manner of construction. The upper members 18 may take the

form of two converging, relatively thin members 18a (FIG. 7),
a continuous, wider member 18b in combination with a fastening
5 member 22b (FIGS. 8 and 9), or even two overlapping
(adjustable) flaps 18c that are detachable by Velcro® pads
(FIGS. 10, 11 and 12). The materials of which these upper
members are constructed may be man-made or otherwise,
including pseudo-suede, nylon or nylon-based textiles, or the
10 like. As illustrated, the apertures 26 (that is, the shape
and size) are configured in conformity with the particular
upper members 18 employed with the footwear.

As illustrated in FIGS. 8-11, the sole 12 may also adopt
unlimited variations in its configuration. In these
15 illustrated embodiments, an outsole 44 is configured to with
an upwardly extending peripheral border 50 (best illustrated
in FIGS. 9 and 11) surrounding the relatively lower surface 52
on which the insole 14 sits. Thus, unlike the outsole 16 of
FIGS. 1-6 which is of a substantially uniform thickness, the
20 outsole 44 provides the peripheral border 50 which may have a
thickness T of approximately 5/16 inch and a depth D of
approximately 1/4 inch.

For these other embodiment of the footwear of the present
invention, the manufacturing thereof may substantially follow
25 the steps set forth above. Clearly, where the upper members
are configured or constructed differently, the steps may be
altered as appropriate or desired.

Although the foregoing discloses the presently preferred
embodiments of the present invention, it is understood that
30 the those skilled in the art may make various changes to the
preferred embodiments shown and described without departing
from the scope of the invention. As such, the invention is
defined only by the following claims.